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ABSTRACT
To introduce kindergarten-second grade children to the process of classification, a multimedia kit has been assembled. Mounted bird specimens, films, data cards, books, stickers and flash cards are provided. The classifying activities and the collecting of data from the bird mounts and films are all structured around games. Eight lesson plans are printed on cards giving the materials needed, the suggested procedure, and the length of time the activity is expected to last. Background information is provided to help the teacher answer common questions. A list is provided of other material and activities to follow up after the kit is returned. A short history of the MATCH Box Project prefaces the guide. (JY)

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TEACHER'S GUIDE

GROUPING BIRDS

THE MATCH BOX PROJECT

Materials and Activities for Teachers and CHildren

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
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Teacher's Guide to

GROUPING BIRDS

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PREFACE

In 1909, a group of Boston teachers formed the Science Teachers' Bureau. Its purpose: "...the exchange of ideas and materials among teachers of science. Specimens of birds, flowers, minerals, etc., used in science teaching are to be sent...to the different schools of the city."

In 1913, the Bureau established the Children's Museum, which from the outset loaned materials and exhibits to schools and other organizations. Our present loan program was begun in 1937, and today we have Loan Boxes on over 100 topics. More than 5,000 "loans" are made each year to teachers in 400 Boston area schools.

In June 1964, under a contract with the United States Office of Education, we started the MATCH Box Project. The term "MATCH" stands for Materials and Activities for Teachers and CHildren. A MATCH Box contains materials, equipment, supplies and activities designed as a unit to foster the teaching/learning of specific subjects at the elementary school level.

Oddly enough, the underlying purpose of the MATCH Box Project is not to make MATCH Boxes. Instead, we are trying to find out more about the role that real objects play in the learning process, and to discover principles for combining materials and activities into effective teaching/learning instruments.

These are the first five MATCH Boxes that have been developed: GROUPING BIRDS (grades K-2); THE CITY (grades 1-3); THE ALGONQUINS (grades 3,4); SEEDS (grades 3,4); and A HOUSE OF ANCIENT GREECE (grades 5,6).

In terms of the materials that the Museum has previously made available to schools, the MATCH Boxes are quite new:

Each one is developed by a team made up of Museum staff members, subject matter specialists and experienced teachers.

Each contains a variety of both materials and activities designed to do individual jobs, but also to "work" together as a unit.

In every box there is a Teacher's Guide, with lesson ideas, background information, ways of preparing for the Box, etc. The Guide serves to organize and activate the three-way encounter between the materials, the teacher and the children.

As part of the development process, both materials and activities are tried out in the schools, modified, tried out again, etc. Prototype boxes are then evaluated more formally in typical classroom situations, and revised prior to regular distribution to the schools.

But if one considers the MATCH Boxes from the point of view of Museum traditions, they aren't new at all. Like the Science Teachers' Bureau that got us started, the MATCH Boxes continue to keep us involved in "...the exchange of ideas and materials among teachers...."

Please let us know at any time what you think about this MATCH Box or any other materials that you receive from the Museum.

Frederick H. Kresse
Project Director
MATCH Box Project

September 1965

ACKNOWLEDGEMENTS

Those who developed the ideas for the Box were:

James Baird, Vice President, Massachusetts Audubon Society
Dwight Clark, Elementary Science Supervisor, Lexington Public Schools
Miriam Dickey, Head of Programs, The Children's Museum
Kathleen Moynahan, Science Specialist, Estabrook School, Lexington
Horace Taylor, naturalist, inventor, and retired teacher

These people aided the development team in making important decisions:

Dr. Maurice Belanger, Associate Professor, Harvard Graduate School of Education
William Hull, Educational Services, Inc., Watertown
Anne Ryle, Director, Elementary Training Program, Harvard Graduate School of Education

Those who produced special materials for the Box include: Robert Bernath, who did the taxidermy; artists Susan Phelps (bird illustrations) and Judy Spock (data charts and flash cards); and David Lutyens, Muriel V. Williams, and Harry Cooper of The Ealing Corporation, who produced the film loops. The MATCH Box Project and The Ealing Corporation are indebted to the many photographers whose work makes up the film loops.

Teachers who tried out the Box or its parts, and to whom we are grateful for comments, suggestions, and effort, include Mrs. Jean Mocksness of the Lesley-Ellis School, Cambridge; Miss Elizabeth Wight of the Tobin School, Boston; Mrs. Sarah Corson of the Davis School, Newton; and the teachers of William Terris' Phi Team at the Estabrook School, Lexington.

Michael Spock (Co-leader)
Genevieve R. Keating (Co-leader)
Sharon Williamson

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I - ABOUT THIS BOX

Every time we sort dirty laundry, separating the clothes into white, colored, and wash and wear loads, or re-sort the clean clothes into piles for each member of the family, returning Johnny's socks and underwear to his top dresser drawer, shirts to the second, and pants to the third, we are involved in the prccess of classification.

In a similar way, city planners classify building types by their use or construction, and scientists classify living things into groups according to their family relationships, habits or locale.

What all these classifiers have in common is an interest in organizing scattered facts or things into coherent and easily understood groups with which they can work effectively. Sorting the clothes into separate drawers speeds the process of getting Johnny dressed in the morning, just as the grouping of water birds in a single chapter of a field guide helps you to identify birds on a trip to a pond.

This Box lets children classify. But instead of everyday things like shirts and socks, they have the opportunity to use the rich and diversified research materials of real birds.

Though the exciting encounter with birds is usually reserved for much older grade levels, we have chosen and correlated the bird materials in such a way that very young children, who may not be able to read, can get all the information they need directly from nine mounted (stuffed) bird specimens and from films that illustrate the birds' feeding and nesting habits.

The classifying activities, and the collecting of data from the bird mounts and films, are all structured around exciting and challenging games.

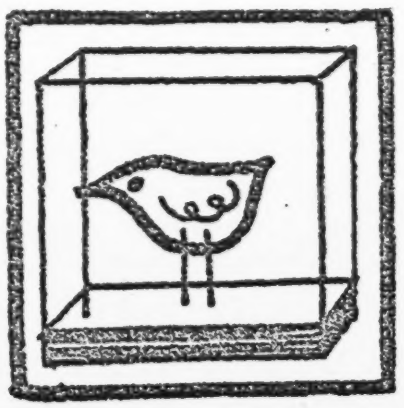
The suggested sequence of activities is carefully worked out so that the children begin with the easiest concepts and operations, and build on these until they can handle much more complex skills.

Errors and problems that occur can be corrected by referring back to the birds themselves. You need not feel that you must supply answers to all the questions the children will have about birds; instead you can direct the children to find out for themselves from the bird mounts and films. In fact, the teachers and children who helped try out earlier versions of this Box appeared to relish the chance to explore together this exciting and unfamiliar subject.

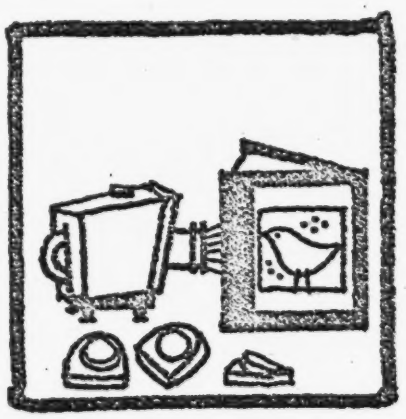
II - THE BOX CONTAINS....

In the box are nine species of birds: Robin, Cardinal, Duck, Sandpiper, Quail, Woodpecker, Swallow, Hummingbird, and Owl. They are all common North American birds, but they differ from one another in appearance and in habits (See Background Information). Each bird is represented in the box in several forms: as a mount, in a section of each set of film loops, on a data chart and on stickers.

Also in the box are a set of flash cards on characteristics of the birds, a film loop projector and screen, as well as story and reference books.

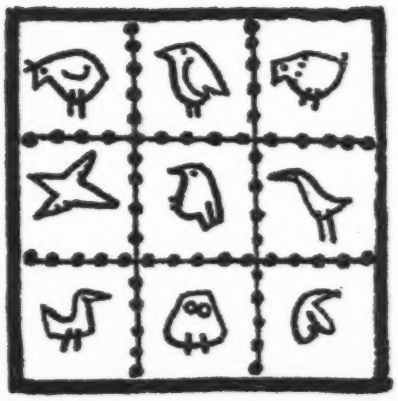


Nine MOUNTS or "stuffed" bird specimens in realistic feeding poses, enclosed in sturdy plastic boxes so that the children may handle them.

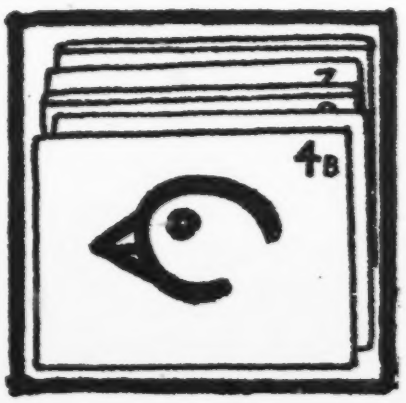


Two pairs of FILM LOOPS, "Feeding" and "Nests and Young". Each species of bird is shown in both pairs of loops. The cartridged loops need no threading or rewinding. A compact projector and desk-top folding screen are also included.

DATA CARDS showing each bird's picture, habitat, food, nest, etc. Children can fit these together into complete reference charts as they gather information from the film loops.



STICKERS: Small gummed illustrations of each bird, supplied in quantity so that each child can sort and re-sort the birds in a number of different ways while keeping a record of his groupings.



FLASH CARDS: Line drawings showing characteristics of the birds. When these are held up, children look for the bird or birds with the characteristic shown on the card. (See the list of characteristics in Section IV.)

BOOKS: Reference books for the teacher and the children, and story books about the birds in the Box.

III - USING THE BOX IN THE CLASSROOM

There are many ways your class can use the MATCH Box to learn the skills of classification. Our selection of activities is based on school tryouts and teachers' comments, and can be adapted to fit your needs.

Each activity is on a separate card, and includes an identifying letter, the length of time the activity is expected to last, the materials needed, and the suggested procedure.

You may vary some activities and use others more than once as the children find out about the birds by: examining the mounts; by building data charts from the film loops; and by looking at the books we have included. On the other hand, it is not necessary to use all of the activities or all of the materials. If you wish, you may play the games using only bird mounts and stickers. If you proceed this way, grouping is done solely on the basis of what the birds look like, rather than on how they act. You will find a sequence of activities on page three to help you plan your lessons.

In Section IV of this Guide, there is a catalog of dimensions illustrated with pictures from the flash cards. The list is arranged to show ways of grouping the birds. You will probably refer to the flash cards and dimension list over and over again as you use this Box.

OTHER WAYS TO USE THE BOX

If your class uses set theory in math, the birds in the Box can be used to build examples of various kinds of sets.

Between grouping activities, your class can try some of the following:

Draw one or two of the birds as accurately as possible. You will be surprised at the results!

Play "What Am I?": Each child has a bird picture pinned to his back and must find out which bird it is. He does this by asking a partner questions which can only be answered by "yes" or "no."

Play "What's Wrong With This Story?"with an alert class. The teacher tells the children a story about the birds, with some intentional mistakes about their habits or appearance. Children must find and correct the mistakes.

After seeing the film loops, they can play "Bird Charades." One child is chosen to be "it." He decides on a bird and does not tell the rest of the class what it is. He acts out a behavioral trait of the bird, and other class members try to guess what bird it is. The person who first guesses correctly is "it" the next time.

BEFORE YOU RECEIVE THE BOX

Formal preparation for using this Box is not necessary. However, some experience with careful observation and grouping will allow your class to play the games more easily.

You might begin by showing the children a random assortment of obviously different objects, asking the class to find first the differences, then the similarities. Differences seem easier to detect and describe than similarities.

Gradually increase the difficulty of these exercises by having the children compare objects that are more obviously alike. For example, one teacher used buttons, another used various shapes of macaroni. A third teacher challenged her class with identical bottles of different-smelling perfumes, with keys that opened different doors, and with different-toned bells.

To acquaint your class with grouping, you can ask the children to sort familiar objects according to similar color, or shape, or texture, or size. Objects such as writing tools, colored shapes, and containers are useful for this purpose.

Begin by asking the class to group the objects according to one characteristic, such as color. You can then ask them to group objects on the basis of two or more characteristics. For example, if you were sorting writing tools, you could ask the children to put all the <u>small, red</u> pencils together.

It is not necessary to use all, or any, of these suggestions, but children who have had some sort of introduction to grouping can enjoy the Box activities fully from the very beginning.

SUGGESTED SEQUENCE OF ACTIVITIES

	ACTIVITIES	GROUPED ACCORDING TO:
Day 1		
	A. Find A Bird C. What Is A Group	Bird feet, size, bills, tails, color
Day 2		
	B. How Are These Birds Alike? D. Filling Groups	
Day 3		
	C. Film Loop Field Trip	Feeding behavior, food, and feeding location
Day 4		
	A. Find A Bird D. Filling Groups	
Day 5		
	E. If You Ran A Zoo	
Day 6		
	G. Film Loop Field Trip	
Day 7		
	A. Find A Bird F. Guessing Groups	Nest location, young and eggs
Day 8		
	H. If You Ran A Hatchery	
Day 9		
	F. Guessing Groups	All dimensions

15 minutes or more
---
any number

A

FIND A BIRD

DESCRIPTION

The children pick out one or more of the bird mounts which have a given characteristic.

OBJECTIVES

The children learn to look carefully at the bird mounts. They make decisions based only on what they see.

MATERIALS

From the Box: bird mounts, flash cards, dimension list from Section IV of this Guide. Later variations of the game will require use of the data charts.

PROCEDURE

You will need a space to spread the bird mounts so they can be seen by all the children. You may want to begin playing this game with the birds at the front of the room, having children come from their desks in turn to pick out a bird. However, the game has been played successfully in a circle, or with smaller groups, where one child asks the questions of the others.

1. You can introduce this game by telling the children "We are going to play a game to see who has the sharpest eyes. I am going to hold up a card and ask, 'Can you find a bird that looks like this... or has this on it?'" Hold up a flash card. Invite a child to come up to the birds and find one that goes with the flash card.

   Begin with easily understood and answered questions, and work up to more complex and challenging questions. Questions about bird size, feet, and bill shape are good starters. (See dimension list.) Don't delay difficult questions too long. Children enjoy being given this sort of problem.

   From time to time you or one of the children may doubt whether the bird chosen matches the flash card. Encourage discussion of the child's answer and his reasons for making that choice. It helps to

refer back to the mounted bird or the data charts. In many cases, there is no <u>one</u> correct answer. Don't worry about this. The important thing is that the children are satisfied with their answers. Sometimes these questions can be resolved by a vote of the class.

The success of this game depends upon the children being able to examine the birds, data charts, film loops, and books at first-hand. Encourage close and careful looking. If a child seems to be taking a very long time examining a mount or data chart, let him keep working but start a second child on another question instead of hurrying him along. A quick answer is not necessarily a good one in "Find A Bird."

Stop the game before the children get bored. Children seem to come back to this game again and again if it is played for brief intervals.

2. As the children become more familiar with the birds through observing mounts and film loops, "Find A Bird" can be played using behavioral characteristics, such as, "find a bird which feeds on the ground," or "lays fewer than four eggs," etc.

EVALUATION

The game is going well when the children are answering questions by referring directly to the data sources, rather than by guessing, asking the teacher, or remembering from past experiences. A good way of telling whether everyone is involved and paying attention is by encouraging the class to challenge selections that they feel do not answer the question.

15 minutes plus
---
whole class

B

HOW ARE THESE BIRDS ALIKE ?

DESCRIPTION

The children compare two birds, looking for similarities or differences.

OBJECTIVE

To make children aware of the many ways in which birds are similar and in which they are different.

MATERIALS

From the Box: bird mounts and flash cards; list of dimensions, Section IV; data charts in later versions of the game.

PROCEDURE

This game is good preparation for the grouping games. The first few times this game is played, use birds which have obvious characteristics in common, such as color, size, and bills.

1. Take two bird mounts and begin by asking the children, "How are these two birds alike?" Ask them to think of as many ways as they can. From time to time you may wish to suggest particular parts of the bird to compare, such as the feet. Use the flash cards as prompters.

2. You can vary this game by taking two birds and asking the children to think of as many differences as possible.

   The more the children have learned about the birds, the more dimensions they will have to compare. Therefore, when the children have seen the film loops, and have the data charts to refer to, this game should become progressively more exciting.

3. Another way to vary the game is to ask individuals or teams to list as many similarities or differences between two birds as possible. Then the members of the class can discuss and criticize each other's lists.

EVALUATION

The more items the children think of, the better the game is proceeding.

10 to 30 minutes
---
any number

C

WHAT IS A GROUP ?

DESCRIPTION

The children make a group of all the birds which have a common characteristic.

OBJECTIVES

The children are introduced to the concept of grouping.
They learn to make a group of birds, taking one dimension or criterion into account.

MATERIALS

From the Box: bird mounts, flash cards, dimension list from Section IV.
From the classroom: clear tape or masking tape.

PROCEDURE

For this game, you will need to place the birds on a desk visible to all children. Have another desk nearby to place the birds on, as you form a new group.

1. Begin by holding up a flash card and asking one child to find a bird. (See Activity A.) Then, still holding the same card, ask, "Can anyone find another bird like this?" Repeat until children are satisfied that all birds that fill the dimension have been found.

   As each bird is selected, add it to a new group of birds, all having the same characteristic in common. Do not be surprised to find there are sets or groups that include all the birds, or only one bird, or no birds at all.

2. When the new group is completed you can point to it and ask: "What is the same about every bird in this set?" or "How is this group different from the one we left behind?" Children can answer these questions with words, by holding up a flash card, or by pointing to the common characteristic on all the mounts in the new group.

3. After the children are comfortable with the game, you can further clarify the distinction between the new and the old groups by point-

ing to the old group and asking, "What is it about this set which we left behind that is different from our new set?" or "What is it that is the same about every member of the old set?" Children's answers may be in the negative: "They all don't have curved bills," but they may also give positive alternatives such as, "They all have straight bills."

Note:

Comparing two groups usually brings up a confusion which some children in all classes have trouble resolving. When asked to state the difference between two sets, a child may say, "Well, all of the birds in this bunch have eyes on the sides of their heads, and all the birds in the other group are brown." The mixing of dimensions (in this case, eyes and color) has to be handled with a good deal of patience and care to avoid confusing a child.

To help a child who mixes his dimensions, start by pointing out that in one sense his answer is correct: "You are right, all these other birds are brown. But remember when we first separated the the birds into two groups, we asked you to find all the birds that looked like this...." (Hold up flash card showing curved bill). "Now, what is it about the bills of all the birds that are left which is different from this picture?"

If the child is still having trouble, you can find the opposite flash card in the same dimension (straight bills) and ask, "Do all the birds in the old group look like this? They do? All right; now how is the old set different from the new?" You could also ask the child, "Why didn't you put the birds in the old set with those of the new set?" Even though this may take time at the beginning, all children should soon be able to keep from confusing dimensions.

Once they understand this point, the game has served its purpose and need not be played again, except as review.

20 minutes
---
any number

D

FILLING GROUPS

DESCRIPTION

The children put the birds into groups that have been set up by the teacher.

OBJECTIVES

To have the children decide for themselves which birds go into each group and then define what makes it a group.

MATERIALS

From the Box: bird mounts, data charts, and flash cards. See also the dimension list in Section IV of this Guide.

PROCEDURE

Filling Groups is a good game to play after the children have successfully completed What Is A Group Activity C. To acquaint the children with the game, you may want to start with groupings which are based upon the obvious dimensions, and work up to those which are open to debate. Disagreement is an essential part of this activity, because it is through solving these dilemmas that the children learn to define groups.

1. Divide the class into as many teams as there are birds, and give a bird to each team. Then put a pair of flash cards on opposite ends of a table so that they are visible to the whole class. Both flash cards should deal with the same dimensions: bills, or feet, or color. Use dimension list in Section IV for reference.

2. Ask each team to look at its bird and to decide with which flash card it goes. Each team, in turn, places its mount in one or the other group. Wait until all the mounts are grouped and then ask if everyone is satisfied. Encourage careful looking. An individual with a strong opinion can be invited to re-group a single bird, and to explain why he thinks his choice is better.

3. The second or third time they play the game, the children may want to question the grouping as it goes along, especially if the dimen-

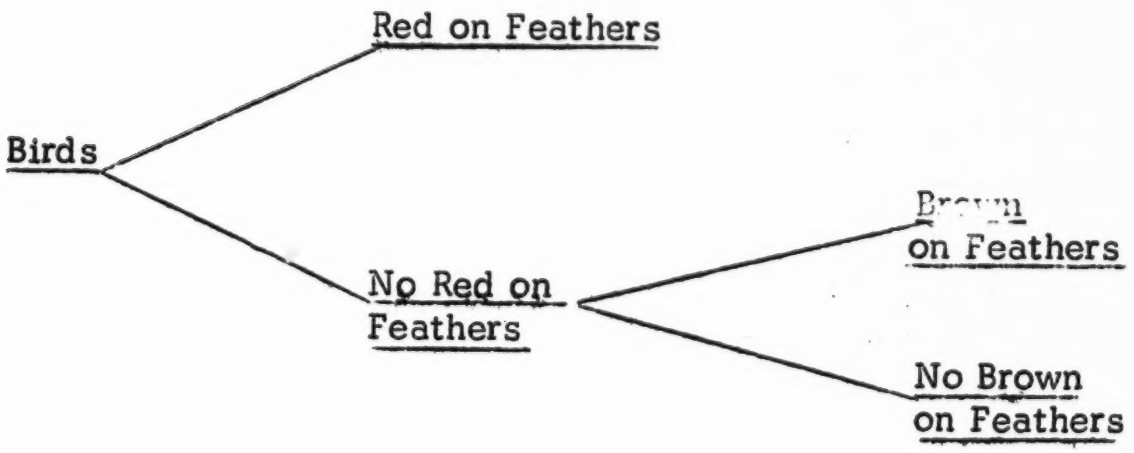
sion is open to question. For example, the birds will not divide easily into short-billed and long-billed birds unless the children can agree on where the dividing line will come. They may disagree about:

- what long means.
- what the flash card says.

To solve the dilemma, the class can define what "long" is by deciding: "All the birds with bills longer than this one will be called long-billed."

Or, the class may simply decide that the data is not available.

Another problem arises when the dimension requires the birds to be divided into more than two groups. For example, when you have formed a group of birds with red on their feathers, you leave a group with green, brown, black, and white feathers. The class can decide to make several groups under the same dimension. See Diagram below:



15-30 minutes
---
class

E

IF YOU RAN A ZOO

DESCRIPTION

Pretending to be a zoo keeper, the children define categories and try them out with the birds from the Box.

OBJECTIVES

The children learn that groupings can serve a purpose and can be tested for their usefulness.

MATERIALS

From the Box: bird mounts, data charts, stickers.
From the classroom: crayons, poster paper.

PROCEDURE

Previously we have accepted almost any category in which the birds were correctly grouped. In this game realistic classifying problems are presented and criteria are established for asking whether a grouping is "good" or not.

1. Explain to the children that lots of people like scientists, museum people, zoo keepers and many others have worked out useful ways of grouping birds to help them in their work: "Today, let's pretend we are zoo keepers taking care of these nine birds. We do not have enough cages for every bird, and our biggest cage isn't large enough to hold all nine birds at once. Our job is to decide the best ways of dividing up the birds into as few cages as possible."

2. As a start, ask the children to divide the birds up into two cages according to size: one cage is large with large-size mesh, the other is a small cage with small openings in the mesh. If the children ask, you can suggest the size of the mesh with a drawing on the board or by saying, "It is big enough for a robin to go through but small enough to stop a quail." When the categories are defined, let the children put the mounts in the proper cages (desk tops).

3. Now is the time to let the children evaluate their work. Does the cage arrangement seem useful? Are there any birds in the small

cage who will be too cramped? Are there any birds in the large cage who could get out through the mesh? Would a new keeper understand the system? Could he add an unfamiliar bird to the cages without too much trouble? (Here you can describe an imaginary bird or use a new bird from one of the reference books to test this question.) Let the children work through the answers to these questions by rearranging any birds they feel are out of place, or by clarifying or redefining any category that seems unclear.

4. Next, challenge the class with a more difficult problem where they have to select the best grouping dimension from several possibilities. Ask them to divide the birds into several cages to make feeding easier. Remind the children of all the different things they know about how the birds eat: where they feed, what they do while feeding, what sorts of things they eat. If they decide to divide the birds on the basis of <u>how</u> the birds feed there might be one cage (or section of a cage) with a high feeding dish for birds like the hummingbird, swallow, woodpecker, and another cage with a dish on the ground for the quail, robin, and sandpiper. The problem remains how to handle the duck which swims as it feeds and the owl and the cardinal who seem to get their food both on and above ground. These questions can be resolved by deciding arbitrarily to assign the birds to one or the other cage or by setting up a third or fourth cage.

   A similar division could be based on making feeding easier by only having to put one kind of food (plant, animal, or both) in the feeding dish of each cage.

   Have the children separate the mounts using desk tops as cages. Will it be easier to feed the birds? Will the birds be happy? Is the arrangement clear and understandable? Can a new zoo keeper feed the birds easily? Using these questions, again evaluate the groupings.

5. If there is time, the children can be given the problem of putting such things as a pond, trees and bushes, or some grass into several cages so that the birds will be comfortable and viewed in their natural settings. Each child will solve this problem on his own after a discussion of possible arrangements, by pasting stickers in cages they have drawn on poster paper.

EVALUATION

The game is going well when the children begin asking the key questions about a grouping, without a lot of prompting.

20-25 minutes
---
class

F

GUESSING GROUPS

DESCRIPTION

The teacher or leader arranges the birds in two groups. The children guess what criterion was used to establish these groups.

OBJECTIVES

The children form groups and guess criteria, and thereby gain practice with grouping. They learn that the membership of groups changes as the criteria change.

MATERIALS

From the Box: bird mounts, stickers, data charts, flash cards, dimension list from Section IV of the Teacher's Guide.

PROCEDURE

After playing "Find A Bird" and "Filling Groups," the children will enjoy this more difficult guessing game.

1. You can begin by separating the bird mounts into two groups, according to one dimension, without telling the class your criterion. For example, you might make a group of birds with webbed feet, and a group of birds without webbed feet. Ask the children if they know why you divided the birds into these groups. Let them try to guess. If they seem confused, you could hint that the birds' feet might be alike in some way, or show them the appropriate flash card.

   After a correct guess is made, play the game a few more times with simple criteria until everyone seems to understand. Once the groups are formed and guessed, ask everyone to say the criteria out loud. For example: "These birds have webbed feet, those do not." A problem arises when a child guesses a correct criterion but it is not what the leader has in mind. The leader can be ready for this type of answer and accept it, or can say, "True, but not what I was thinking of."

2. Play this game, using your criteria, until a child is ready and wants to be a leader. Ask the child who is leading to put the birds into

two groups, as you did. A problem might arise if he wants to divide the birds into groups, using 2 different dimensions; for example: "One group has green feathers, and the other has webbed feet." To avoid this problem, have the child whisper the dimension to you before he asks the class. In some cases, the child might want to make more than 2 groups. This is fine if each group is based on the same dimension: feet, or foods, or color, or shape of bill. Let the other children guess what the groups are. The first child to guess correctly has the next turn as leader.

3. You can also play this game by grouping the birds according to feeding habitat, foods, and nesting habits. This version is more difficult because these dimensions are not seen on the birds themselves. You may want to set aside one period when the game is played exclusively with such dimensions. The data charts should be available for reference. When the children are particularly confused by a group, they can assemble all the data charts belonging to one group of birds and thus compare the birds' habits more easily.

4. LATER: The children can play this game in pairs, with one child setting up the groups and another guessing. OR, you can give a set of bird stickers to each child and allow him to make up his own groups on a piece of paper. Children can then put their papers on display and the class can try to guess how each child has grouped the birds.

20 - 25 minutes +
---
class in teams

G

FILM LOOP FIELD TRIP

DESCRIPTION

The children view film loops to collect information about the birds' habits. They then make a data chart for each bird by attaching data cards to the data charts.

OBJECTIVES

To teach the children how to find and record information in a useful way.

MATERIALS

From the Box: bird mounts; film loops, projector, and small screen; data chart blanks and cards; reference books, if desired.
From the classroom: movie screen or blank wall.

PROCEDURE

Before the lesson, set up the projector in front of a screen or blank wall. Then take out the data cards showing: the birds, feeding locations, and foods.

1. Divide the class into nine teams and give each team a bird mount and a blank data chart. Explain to the class that they will " go on a field trip " by watching film loops on many birds, but that each team is to work as if it were a group of naturalists doing research on one bird.

   Show the children a blank data chart and demonstrate how to attach the data cards.

2. The bird illustrations should be placed in the chalk tray so that all the children can easily see them. Show the film loops on " Feeding " and ask the children to look for their particular birds in the film. When the loops end, ask a member of each team to come to the chalk tray, find the picture of his bird, and take it back to his team. This is an important step if each team is to relate the mount it has to the bird in the film. Show the loop again, if necessary.

3. Now, spread out the feeding location and food cards in the chalk

tray. Explain to the children that on this " trip " they will try to discover <u>where</u> their birds eat, and <u>what</u> they eat. Show the " Feeding " loops again. Ask members of each team to come up and choose the right cards for their team's bird. Wait until all teams are finished choosing cards before discussing whether they are correct. Show the film loops again if some teams have not chosen their cards. Teams which have finished can continue to watch the film loops, in order to check their choices. (If the children seem to be having trouble, you can have them first find feeding locations, then foods.)

4. When the children finish, ask them if they are satisfied with their data charts. Allow the teams to trade cards, if they need to correct their charts.

You can let the teams complete the date charts on their own whenever they have free time.

1. Set up the film loops on " Nests and Young ", the projector and the <u>small</u> folding screen on a table apart from the other children. Pile the data cards showing nests and young there, also. Allow individual teams to go to the table at different times and complete their own data charts by watching the films and selecting the proper cards from the pile.

2. When all the teams have completed the charts, again ask if they are satisfied. Allow the children to correct themselves as much as possible.

EVALUATION

If the children have discovered how to assemble the data charts by referring to the film loops, then the lesson has gone well. The success of the data charts will be apparent from now on if the children readily refer to them as sources of information they can trust.

20-30 minutes
---
class

H

IF YOU RAN A HATCHERY

DESCRIPTION

Pretending to own a hatchery, children devise ways of sorting birds based on the characteristics of their eggs, nests, and young.

OBJECTIVES

The children solve real classifying problems, learning that groupings can serve a purpose, and can be tested for their usefulness.

MATERIALS

From the Box: bird mounts, data charts, stickers.
From the classroom: crayons, poster paper.

PROCEDURE

Describe how a hatchery operates. Most hatcheries breed and raise young birds for farmers and hunters. We are going to pretend to operate a hatchery that supplies many different birds to zoos and museums. Choose one or two from the following sorting problems:

- One problem for the hatchery owner is to group the birds' eggs according to whether or not the baby birds can take care of themselves. Ask the children to think about which young leave the nest and feed themselves, and which young must be fed by the parents. Then ask them to divide the birds (or "young" data cards) into these groups. The children may notice that the helpless young have closed eyes and few feathers, while the others are fuzzy with open eyes. When the children have grouped the birds or cards, discuss with them whether or not the groupings make caring for the birds easier.

- The next problem involves knowing the nesting sites of each bird. If you were providing the nine birds with room to build their nests, how many different kinds of sites would you need? You may be able to satisfy the birds with ground sites, ledges, and enclosed nest boxes. Have the children separate the birds into three groups which nest in these places. Do you need more than three? Are there any birds left over?

- You can have the children group the birds according to how many eggs they lay. This will help the hatchery owners decide which birds to keep if they wish to raise large numbers of baby birds. From this grouping, you could also predict how many sets of parents it would take to fill an order for a given number of young birds.

- Finally, the children can try to predict what kind of young will hatch out of an unidentified clutch of eggs by grouping them into categories by size, shape, color, and the number in a clutch. By asking which of the various categories the unknown eggs belong to, it is possible to narrow down the possibilities to one or two birds.

Once any of these problems have been solved by grouping the birds, the children can use stickers to make the groups for themselves on poster paper.

EVALUATION

This game is going well if the children begin, after some practice, to structure the solutions to the problems and ask evaluative questions without much prompting from the teacher.

IV - BACKGROUND INFORMATION

Here are some questions that teachers and children asked during tryouts about the materials in the Box and the ways they are used.

BIRD MOUNTS

Are the birds alive?

Each one was alive once, but it is not alive any more.

Are the mounted birds real?

They are the stuffed skins of real birds, which were once alive.

What killed the birds?

Some simply died of old age, some were hit by cars, others accidentally crashed into buildings.

How were the birds stuffed?

The person who found the dead bird took it to a TAXIDERMIST to have it stuffed. The taxidermist took the skin off the dead body, measured the body very carefully, and made another body for the bird out of balsa wood. He put wire in the legs and feet, and then put the new wooden body inside the bird's skin. He also replaced the bird's eyes with glass ones, to make the bird look the same as it did when it was alive.

How can I find out more about the birds?

Everything the teacher and children will need to know about these birds to carry out the activities can be learned by looking carefully at the mounts and the film loops. However, you can read about these species and others in the books we have included in the Box.

PROJECTOR AND SCREEN

Can the children use the projector themselves?

Yes! It is sturdy and simple to operate.

How do you load and start the film projector?

Insert the plastic film cartridge into the slot at the back of the projector. Notice the words "top" and "bottom" on the cartridge, and the arrows pointing toward the projector. Turn knob to "on" position.

How do you adjust the projector?

The knob marked "frame" is turned to bring the edge of the picture to the edge of the projector opening. Use it if the edge of the picture should show a black line.

What should you do if the film jams?

If the film stops on one frame of the loop, turn off the projector immediately. Then remove the cartridge from the projector, and advance the film slightly with your fingertip.

How does the screen work?

The screen unfolds, with the top metal flap hooking to the back portion. The projector is positioned so that the picture is directed to the inside of the screen. Individuals and small groups can watch films this way. A conventional screen can be used for larger groups.

CATALOG OF DIMENSIONS

How can these birds be grouped?

The drawings on the flash cards represent some characteristics or dimensions that can be used to group and match the birds.

How are the flash cards used?

The flash cards are used to ask questions without words. The individual activities explain how this is done, but here are some examples: If you hold up a flash card showing a webbed foot, the children try to find a bird with webbed feet. If you attach a flash card showing a long bill to one desk, and a flash card showing a short bill to another desk, the children put the birds they think match the "long bill" card on the first desk, and all the birds that match the "short bill" card on the other desk.

How can I use this catalog of dimensions?

You can use this list to select sets of flash cards. All the flash card illustrations are shown and indexed on these pages, so you do not need

to shuffle through the stack of cards endlessly.

The illustrations are grouped here under separate headings: cards illustrating foot type are together; cards showing color are together; cards picturing bill shape are together. Each card has a letter and a number. The number is the same for all cards having to do with a particular dimension. In the case of a few cards which can be used for more than one dimension, the card carries two numbers, and the illustration is repeated in the catalog of dimensions.

To group the birds using the flash card illustration, first decide which dimension you are going to use: foot type, or bill length, for instance. (Some good starting characteristics are shown on the second sheet of the dimension catalog.)

When you have chosen a category (foot type, for instance) as a basis for your grouping, there are several things you can do. You can pick one characteristic, such as webbed feet, and its opposite, non-webbed feet, to make two groups. Or you can pick a number of characteristics to make several groups. In this case you could use webbed feet, feet with 3 toes in front and 1 in back, and feet with 2 toes in front and 2 in back.

When using a size or length category, you may have to help the children decide on their own cut-off point--where do the short bills end and the long bills begin? If the children wish to make a third card, for medium-length bills for instance, this is another acceptable solution.

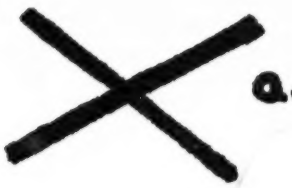
What kinds of things are shown on the flash cards?

Pictures of the birds themselves, which can be matched with the bird mounts.

Auxiliary cards marked "X" and "?" that can be used in the following situations: X represents the absence of a given characteristic (for example, birds with no red on them); and "?" is used when the dimension cannot be determined from the Box materials (the arrangement of toes on the hummingbird's tiny foot, for example).

Sketches illustrating birds' traits. These are arranged in the order suggested in the lesson sequence. First is a selection of characteristics we've found easy to start with. Then come other dimensions that can be observed on the bird mounts. Finally there are cards showing nests, eggs, feeding, and behavior of young--things that the children will see in the film loops.

CATALOGUE OF DIMENSIONS



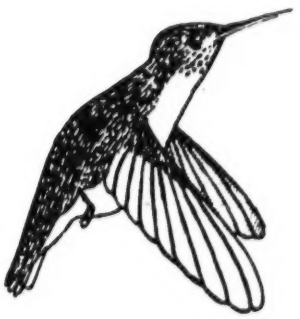
a. IS NOT

b. CAN'T TELL

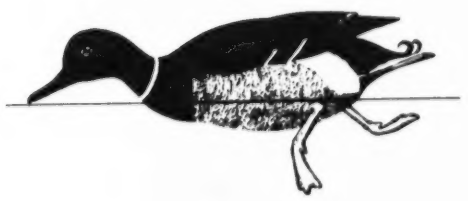
I. BIRDS

a. OWL

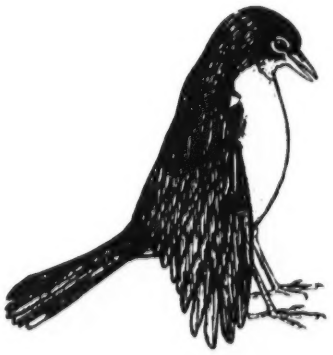
b. HUMMINGBIRD



c. DUCK

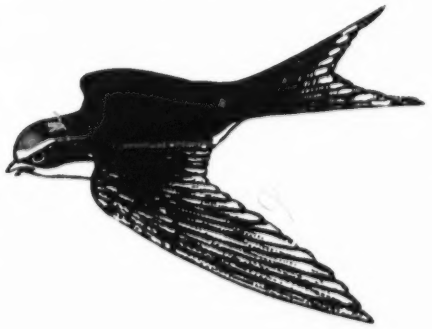


d. ROBIN

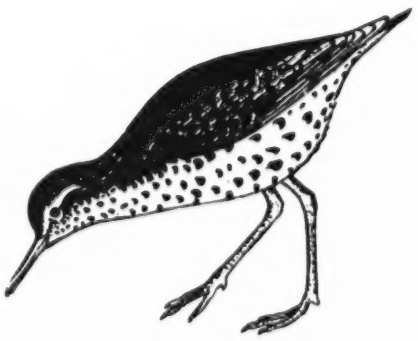


e. CARDINAL

f. SWALLOW

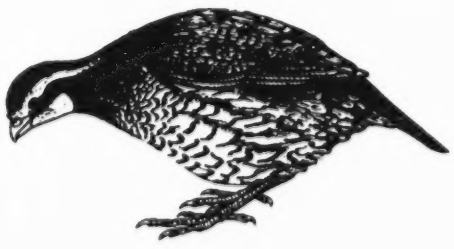


g. SANDPIPER



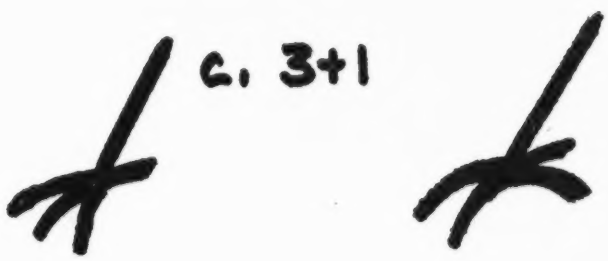
h. WOODPECKER

i. QUAIL

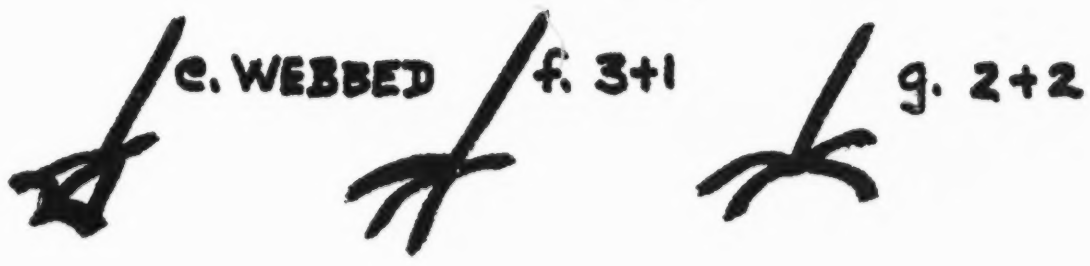


2. FOOT TYPE

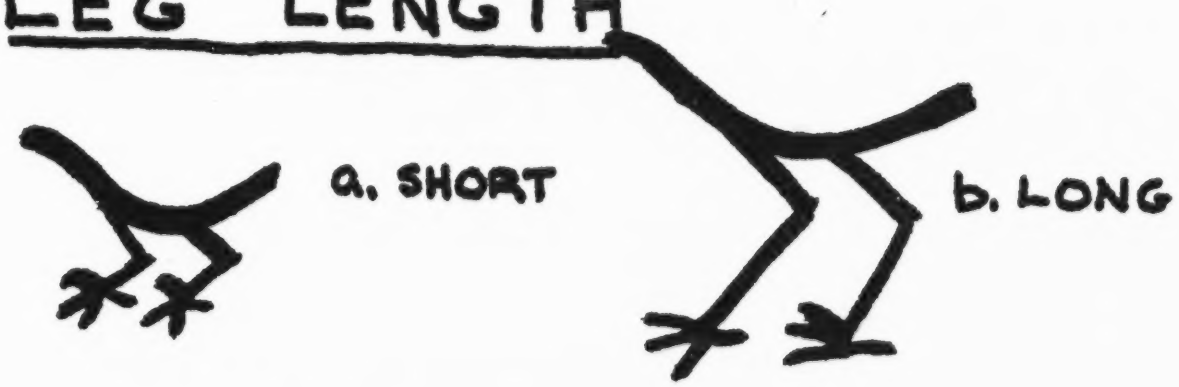
OR



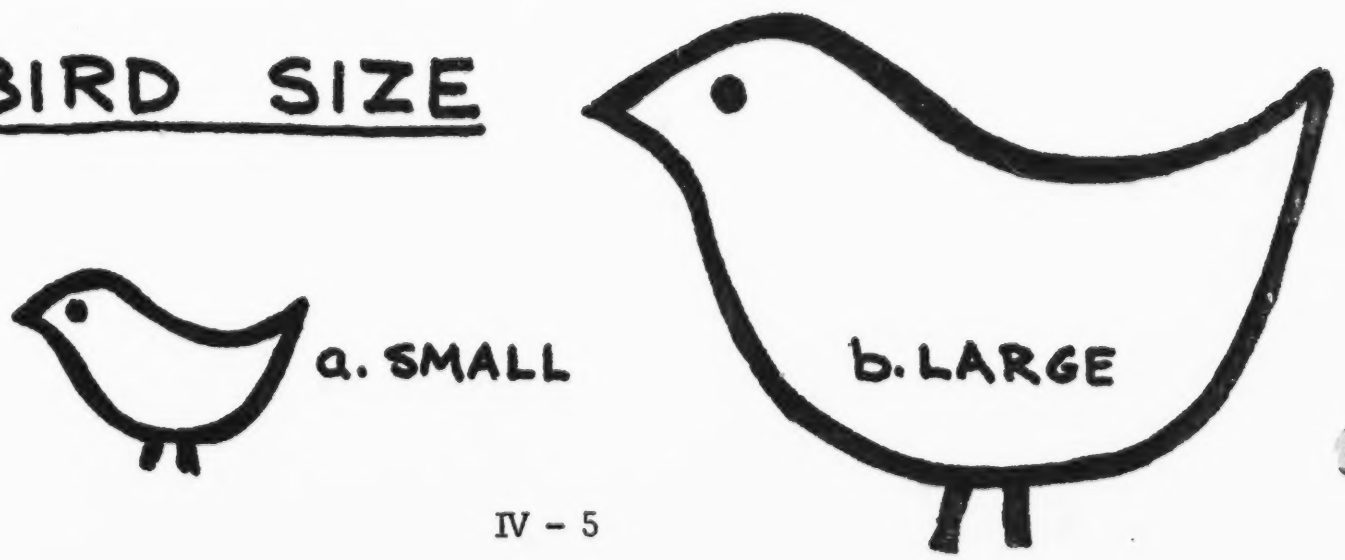
OR



3. LEG LENGTH



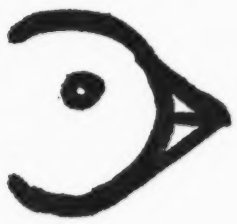
4. BIRD SIZE



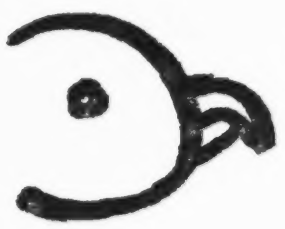
5. BILL SHAPE

a. POINTED

b. ROUND

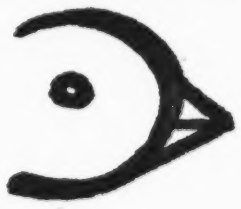


c. STRAIGHT

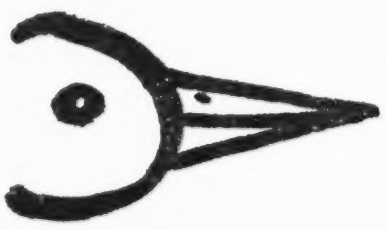


d. HOOKED

6. BILL LENGTH

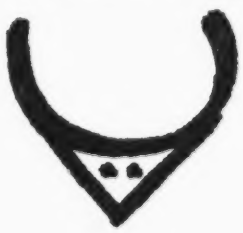


a. SHORT



b. LONG

7. BILL WIDTH



a. WIDE

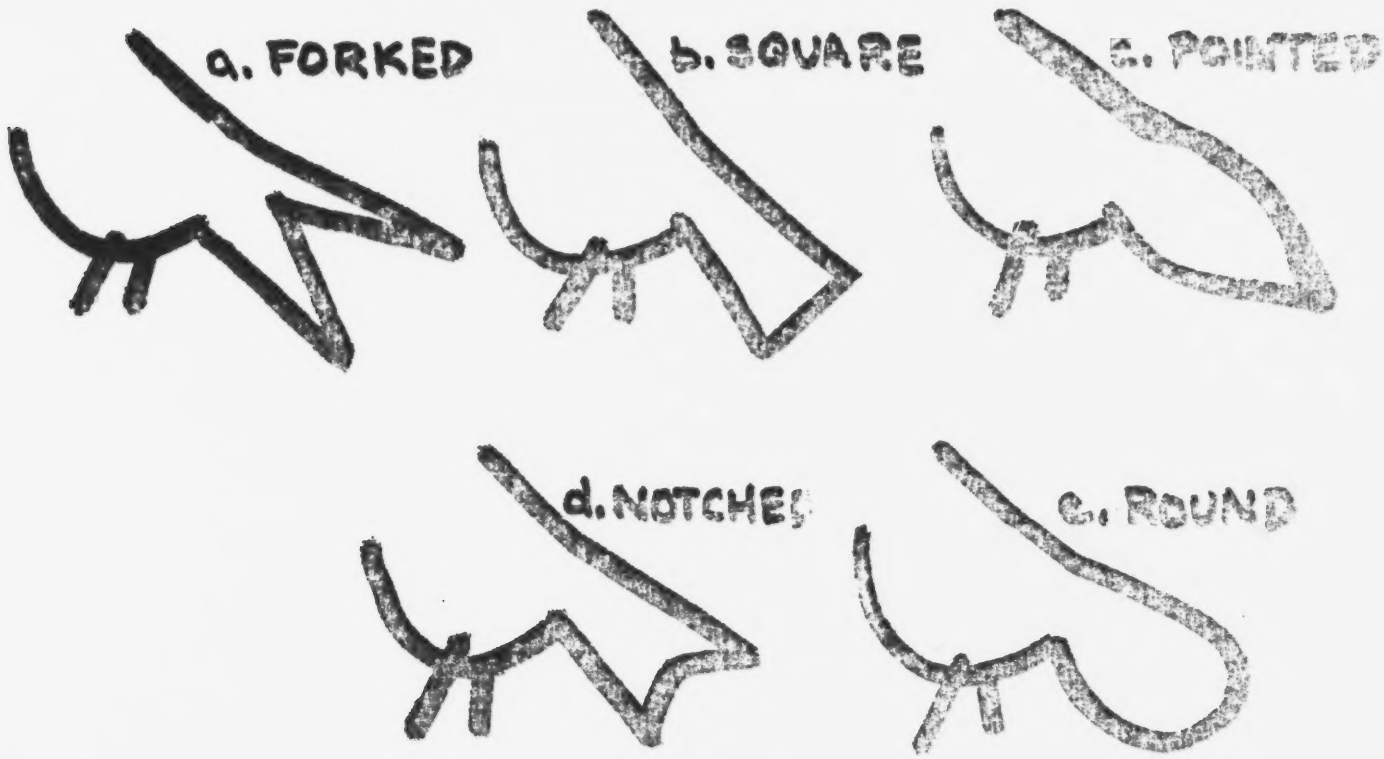
b. NARROW

8. EYE POSITION

a. SIDE

b. FRONT

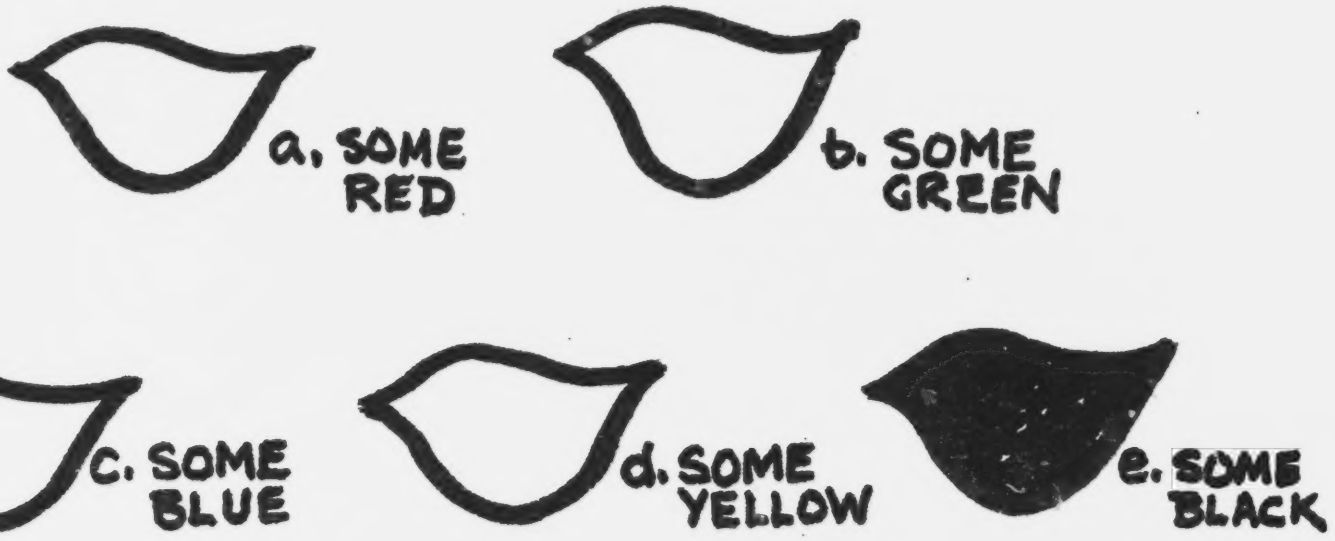
9. TAIL SHAPE



OR

OR

10. FEATHER COLOR

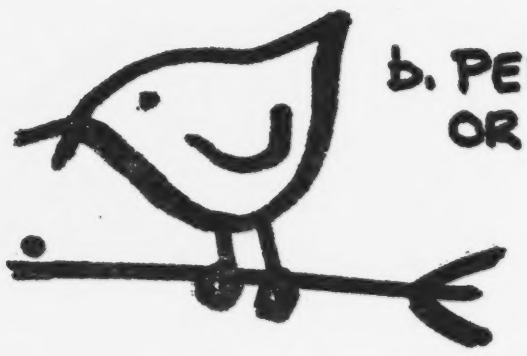


11. FEATHER PATTERN

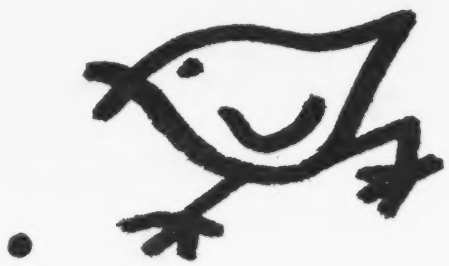
12. FEATHER BRIGHTNESS

13. WHILE FEEDING

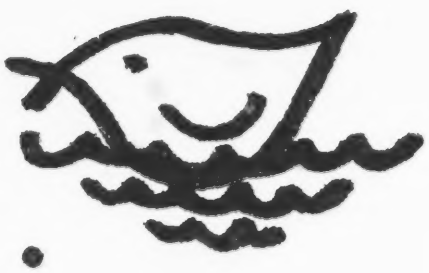
a. FLIES



b. PERCHES OR CLIMBS



C. WALKS OR HOPS

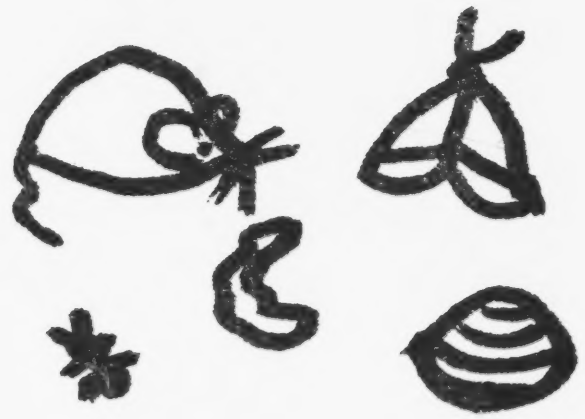


d. SWIMS

14. EATS

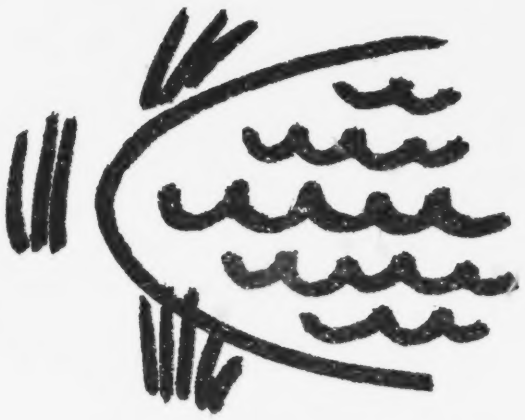
a. MOSTLY PLANT

b. MOSTLY ANIMAL

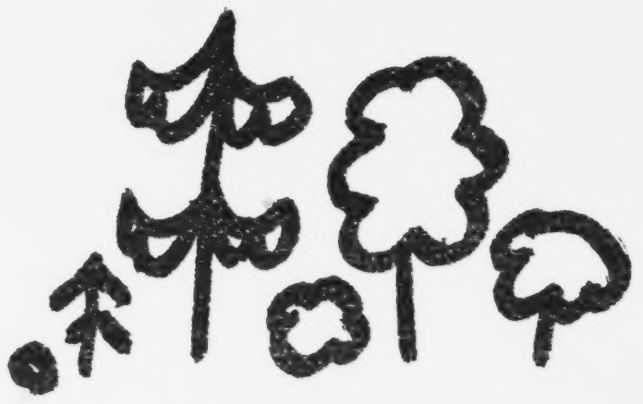


c. BOTH PLANT AND ANIMAL

15. FEEDS ON OR NEAR



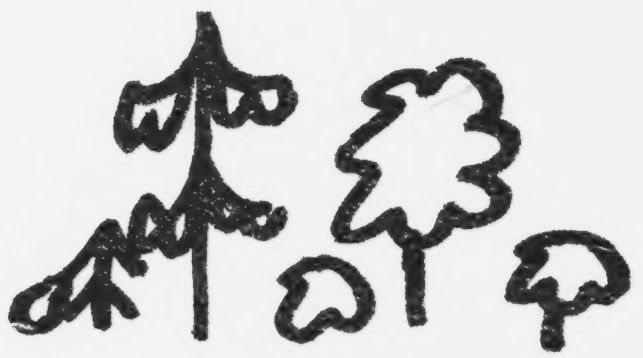
a. WATER



b. LAND

OR

C. FIELD



d. FOREST

OR

e. NEAR PEOPLE

f. AWAY FROM PEOPLE

OR

WATER, FIELD, WOODS AND TOWN (e) ALL TOGETHER

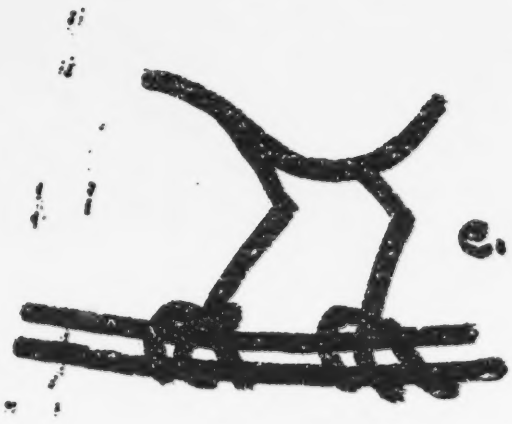
16. FOOT USED TO

a. HOP

b. WALK + RUN

c. SWIM

d. CLIMB



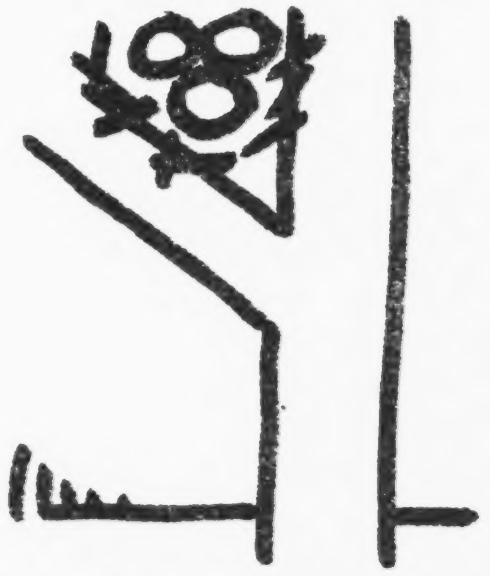
e. PERCH

f. CLASP

g. SCRATCH

17. NEST LOCATION

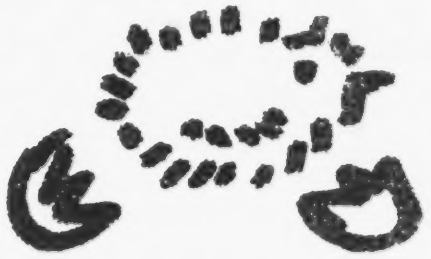
a. ON GROUND



b. ABOVE GROUND

18. CONDITION OF YOUNG

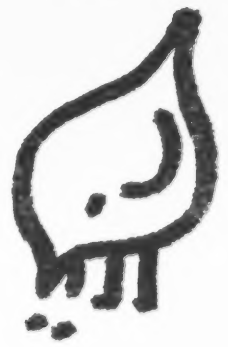
a. NAKED, WITH EYES CLOSED



b. DOWNY, WITH EYES OPEN

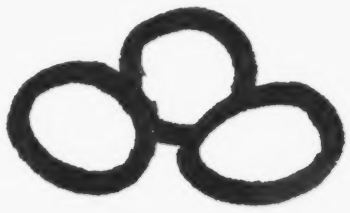
19. BEHAVIOR OF YOUNG

a. UNABLE TO LEAVE NEST + FED BY PARENT

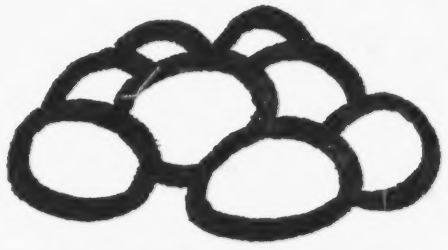


b. ABLE TO WALK + FEEDS SELF

20. NUMBER OF EGGS



a. FEW



b. MANY

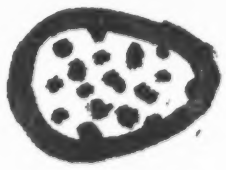
21. EGG SHAPE

a. ROUND

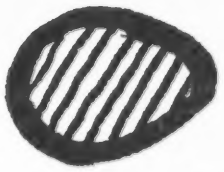
b. POINTED

22. EGG COLOR

a. WHITE



bSPECKLED



C. COLORED

V - FURTHER EXPLORATIONS

You can continue to develop classifying skills with other interesting things such as cars, animals, or people. On the other hand, you can capitalize on the children's interest in birds and continue to study the natural history of birds.

There are loan exhibits available from The Children's Museum on: "Bird Homes," "Spring Birds," Winter Birds," and"Bird Adaptations." These may be reserved for your class by calling the Museum's Loan Department, 524-6472.

Other grouping materials and activities are available from the following sources:

Teachers Publishing Company, Box 333, Darien, Connecticut. "Properties Unit" by John McGavack, Jr., Supervisor of Science, New Haven Public Schools. Reprints of this article on classifying with everyday materials, which appeared in the January, 1965. issue of Grade Teacher, are available at $1.00 each.

Elementary Science Study, a division of Educational Services, Inc., 108 Water Street, Watertown, Massachusetts. A set of Attribute Blocks, with instructions for playing 25 different games, is being developed. If you are interested in trying these out in your classroom, contact Mr. William Hull or Mr. Randolph Brown at the above address.

American Association for the Advancement of Science, 1515 Massachusetts Avenue, N.W., Washington, D.C. 20005. Each of five parts of an elementary curriculum development guide, entitled "Science--A Process Approach," contains one or more exercises in classification. Though designed as a handbook for teachers participating in this AAAS program, the booklets will be available for purchase by other schools in the fall. The price has not been determined at the time of this writing.